

AMERICAN VETERINARY REVIEW,

JUNE, 1895.

NOTICE.—Please address all communications regarding matter for publication, books for review, exchanges, etc., to the Editor, 139 and 141 W. 54th St., New York.

EDITORIAL.

TO OUR READERS.—When we reassumed our editorial labors and after heavy pecuniary sacrifices we became again the owner of the REVIEW, we knew some of the various obligations we were contracting—and among these, that of providing the REVIEW to our subscribers in proper time and do away with the numerous complaints which were made some time ago.

But we found our good intentions handicapped by the impossibility that we met to obtain what could be called a correct list of subscribers. We have with difficulty however secured a list—but could we use it—would it be of any advantage—that was an important question.

At all risks we used it and sent our first numbers and this June issue to all those whose names and addresses were given to us. And as the question of the future life of the REVIEW depends now on its readers, we must ask that the notice we have inserted in the April issue be complied with AT ONCE.

Shall we stop our work or shall we continue it—is the problem we must ask of our friends.

Send us your subscription, as we cannot recognize those

given to our predecessors, be careful of giving us your whole names and full address and trust us for the rest of the work. We will do it. Do yours. The life of our Journal is in your hands.

IMPORTANT NOTICE.—*As we go to the binder, on account of numerous letters of inquiries that we have received, we feel that we must make a statement of importance to those who have subscribed with Sabiston, Murray & Co., who have paid for their subscription, or who may have received communications from the receiver appointed by the Court to settle their business. We have not nor will we assume any connections or responsibility in these matters. We can do nothing in relation to these claims, and the work that we are now undertaking must be considered as new and entirely independent of the last 18 years.*

As we have said already—shall we live, or not. It is for the Veterinarians to answer.

UNITED STATES VETERINARY MEDICAL ASSOCIATION.—Since the REVIEW has existed we never have failed to remind our readers of the meetings of this national body. Initiated with it, born with it, informed of all its actions it was not a duty but a pleasure to call the profession to the work in perspective.

For some reasons unknown we have as yet not been officially informed of the coming annual meeting—no doubt when all is well prepared and the programme well known the officers of the association will not ignore the influence that the REVIEW might have in the success of the next gathering and then we will be better able to speak of the work and of the pleasure which is going to occupy the days of the September meeting.

As it is, however, we take advantage of the notice which has appeared in our contemporary the Journal of Comparative Medicine and little as our information may seem we are pleased to announce that the "the Comitia Minora of the association have decided to hold the annual meeting of 1895 in September next, in Des Moines, Iowa."

We hope later on to keep our readers posted on this important event.

SIXTH INTERNATIONAL CONGRESS OF VETERINARY MEDICINE.—The next Veterinary Congress is to take place this year in Berne, Switzerland, in complying with the vote passed at the preceding meeting—as we have already remarked in our last issue.

The programme laid out for this event is usually large and important. Six questions are to be discussed.

1st. International Veterinary Sanitary police—proposition of an international convention concerning the cattle trade ; publication of an international bulletin of the contagious diseases of domestic animals.

2d. Inoculations for diagnosis or to grant immunities to the point of view of veterinary sanitary police ; results obtained.

3d. Tuberculous meats and public hygiene.

4th. Influence of veterinary science upon social development and increase of public wealth.

5th. Contagious pleuro-pneumonia, results obtained in every country with the means used to stamp it out.

6th. Unification of anatomical nomenclature.

All these questions are of great importance and the selection of the reporters in the various sections shows how the committee has been careful in trying to obtain the most valuable information.

The second question where the subject of malleine, as diagnostic mean of glanders, tuberculine, as that of tuberculosis, pneumo-bacilline for pleuro-pneumonia, the preventive inoculations against symptomatic anthrax, the inoculations against tetanus, and swine diseases, etc. This question itself will draw reports from some of the most scientific men in the profession, and certainly the reading of the papers of the reporters of the fifth question will call from the various parts of the world statements of such value that the presence of pleuro-pneumonia on earth will be readily decided.

These meetings, as they have taken place every few years have always proved a success and besides the good that they have done in a scientific point of view have had for results to bring in closer connection many of the members of the veterinary confraternity. It is evident that the Congress of Berne will not be behind its predecessors. The efforts made by the committee, the hearty support that it has received from the Federal Government, all point out to the fact that a trip to beautiful Switzerland from the 16th to the 21st of September will be one of unusual pleasure and of scientific benefit.

COTENTINE COWS.—We may be accused of repeating ourselves and some of our readers may object to our returning to this subject, yet we feel that on this occasion one word more has to be said by us.

Not by us, truly speaking, but by one who is known to many of us—Dr. Heath, V.S. has been a careful student of Zootechny, he has made himself familiar with breeds of cattle, he has for several years delivered lectures on the subject of hygiene, breeding and care of cattle—and as such his statements must be considered as authoritative.

Let us then allow him to express his opinion on the cotentine cows of which we have spoken so much, but which he knows, which he has seen and studied in their home la Basse-Normandie and upon which he addresses the Breeders and Owners of Jersey Cattle. The following he has sent us and we are pleased to make his statements familiar to our readers, veterinarians and others who must be interested in that branch of our science.

TO BREEDERS AND OWNERS OF JERSEY CATTLE.—For more than thirty years I have been an admirer of the Jersey Cattle. I believe I was the first to commend the Jersey for the cheese dairy; I glory in the results of the thousand grand tests for milk, butter and cheese; and I have written against the evils of in and in breeding, injurious pompering, too severe confinement, and overtaxing in forced testing of long periods. In all of these I have warned against the degeneracy of the race. For years I have written and warned against these debilitating and degenerating influences, but the overwhelming booms of the Jersey like the resistless torrents of overflowing mountain streams have swept every thing before them; and alas! too sadly, these booms have overwhelmed the Jersey breed of cattle and swept them into the *maelstrom*

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of tuberculosis. Now, the only means of rescue from this imminent peril to the breed is to destroy the diseased root and branch, and to breed back the healthy to their stalwart progenitors, the Cotentine blood of the Normandy, the noblest, longest, most vigorous and best milk and meat animals of the world. But what shall we do with our long-cherished pedigrees? ask the Jersey breeders. Save the good with the healthy cattle, and destroy the worthless with the tuberculous stock! All through Europe the blood of the magnificent Cotentine of Normandy can be traced to whenever doing and beef excellence in the herds are found. It is like the blood of the grand old Block Flemish Draft Horse, it permeates every breed of Draft Horses. None are superior without this Flemish blood. The Jersey, in her island home, though in-bred for a hundred years, and though refined and dwarfed, yet, with her Norman blood, her similar surroundings and treatment, she retains the butter and beef qualities in a surpassing degree even under much adversity. This is also true of her cousin and neighbor the Guernsey. The Jersey, in the United States and Canada, and doubtless in England, will not probably average above seven hundred pounds weight; while the noble Cotentine will average about double that weight. The Jersey maintains her appetite and digestive powers descended from the Norman, and her consumption of food is now relatively much greater than her progenitor. Weight for weight, the Norman cow consumes far less food than the Jersey, and yields relatively a larger amount of products. It is doubtless true, that with the same amount of food, cow for cow, the Cotentine will give a product of milk and meat, of greater weight and value than any cow in the world.

I know this is a new and startling letter to Breeders and Owners of Jersey Cattle. But my convictions have been verified by my investigations and studies of the breeds of Jerseys and Cotentines, in their herds, pastures and homes. Further, I trust that my method of breeding out the tendency even, to tuberculosis in the Jersey and Guernsey breeds, will give relief and hope to the Breeders of these strains of valuable bovine blood, as the vigor, stamina and strength of the Norman blood has ever resisted the infection of tuberculosis. Separate your healthy, large and robust from the small and weak, and breed them up and back to their source of health and excellence. In so doing you will not lose the beautiful heads and large lustrous eyes, nor the shades of cherished colors, but you will secure size and stamina and health, for all of these are inherent in the substantial Normandy, so long cherished in the Cotentine blood. The Cotentine though large, yet relatively the per cent. of bone is less than that of the Jersey, Guernsey or other short horn. I have never eaten better beef or veal than that of the Jersey or Norman. The Jersey milk and butter are good when fresh, but the keeping quality of the Cotentine products are far better. The waxy texture and aroma of the Normandy butter is superlative, and its keeping quality superior to any butter with which I am acquainted. I have seen it in large piles unsalted for two or three days, then salted and put up, having maintained fine texture and full aroma for weeks. The bulls of the Normandy breed are gentle and safe, and the cows are kind and submissive.

What I have written has in nowise been inspired by self-interest, as I have not, and do not expect ever to have one dollar invested in Cotentine breed of cattle of Normandy; nor have I any French interests.

A. S. HEATH, M.D., V.S.

ORIGINAL ARTICLES.

CROUPOUS PNEUMONIA IN THE HORSE.

BY ARTHUR SALINGER, V.M.D., Demonstrator of Surgery, Veterinary Department,
University of Pennsylvania.

Read before the Pennsylvania State Veterinary Medical Association.

The consideration of croupous pneumonia is by no means new, a discussion of some of the more important symptoms and newer remedial agents in the face of recent investigations is however in place:

It is the object of this paper to call attention to the pathology, diagnosis and treatment of acute lobar pneumonia.

The synonyms for this disease are Lobar, Croupous, or Fibrinous pneumonia, pneumonitis and Lung fever.

Pneumonia is one of the most widespread of all acute infectious diseases. There is scarcely an acute infectious disease so frequent in the horse as pneumonia. Climate does not seem to have much influence in the production of this disease, it prevails equally in cold and in hot countries. Cold has been thought to be one of the most important etiological factors and it is undoubtedly true that the disease sometimes follows a sudden chilling or wetting, but in many cases it will be impossible to obtain any such history. Pneumonia frequently follows traumas of the chest, when it is known as contusion pneumonia.

A change of opinion has recently taken place since the developement of bacteriology in regard to the etiology of croupous pneumonia. It is now unquestionably considered an infectious disease depending upon a specific micro-organism: What has furthermore given strength to the opinion among the medical fraternity is the fact that many epidemics of pneumonia have been described.

The diplococcus pneumonia of Fraenkel is the most constant organism found in croupous pneumonia, and it is now believed

by the most competent authorities to be the specific agent of this disease. It is identical with the micrococcus which Pasteur and Sternberg found in the saliva of certain individuals and which produces Septicaemia in the rabbit. The researches of Friedlaender, Weickselbaum and others show that it is by far the most constant organism in pneumonia. According to the dominant view pneumonia is an infectious disease caused by this diplococcus which has its main seat and produces its chief effect on the lung, and can under favorable circumstances invade the pleura, meninges and endocardium. It is a widespread organism, at times present in the buccal secretions of healthy animals, in the secretion of the nose and mouth it may be demonstrated by treating the ordinary cover glass preparation with glacial acetic acid, and then washing off the acid, dropping on aniline oil and gentian violet, which is to be poured off and renewed two or three times. The organism is seen to be somewhat elliptical, lance-shaped coccus occurring in pairs, hence the term diplococcus. It is usually encapsulated. Inoculation experiments upon dogs, guinea pigs and mice have proven successful. The germ producing the well-known pathological changes occurring in croupous pneumonia.

Morbid Anatomy: Since the time of Lannaec, pathologists have divided the stages of pneumonia into three well-known divisions of engorgement, red hepatization and grey hepatization.

The stage of engorgement usually lasts but a short time, from twelve to thirty-six hours. The lung tissue is deep-red in color, more solid and on section the surface is bathed in blood and serum. Crepitation is still present although not so marked as in normal lung.

In the stage of red hepatization the lung tissue is firm, solid and airless. On section the surface is dry, reddish-brown in color and the deeply congested appearance of the first stage is absent. In this stage the lung is very friable and is readily broken by the finger. Careful inspection shows the surface to be distinctly granular and the air cells filled with fibrinous

plugs. The smaller bronchi often contain fibrinous plugs. This stage usually lasts about two days.

Stage of grey hepatization is the first stage in the process of resolution. The exudate is softened, the cell elements are disintegrated and are rendered capable of absorption. The grayish appearance is due to the absorption of the haemoglobin and red blood corpuscles, with an increase in the number of white corpuscles. A point to which especial attention should be called is the almost frequent association of affection of the pleura. It can be stated that in every case of pneumonia where the inflammatory process reaches the periphery, the pleura is affected.

The pleurisy may be either a dry one pleuritis sicca or a pleurisy with effusion may be present. We will have occasion again to refer to pleurisy with effusion in considering the symptomatology and prognosis of croupous pneumonia. It will be noticed that the right lung is more frequently affected than the left one.

Symptoms. This disease usually begins with a marked and prolonged chill with rapidly rising temperature, frequently going from 103 to 106 degrees with rapid pulse, marked depression, hebetude and anorexia. The extremities will be found to be cold. The pulse may be from 60 to 100 in a minute. In severe cases the conjunctiva may be seen to be jaundiced due to profound blood alterations. Symptoms referable to the lungs manifest themselves at once. Respiratory movements are quickened and painful, due in the majority of cases to early involvement of the pleura. The type of breathing is costal. The affected animal does not lie down or if found in the recumbent position, the animal will lie on the affected side. The standing position of the horse is typical. The front legs are usually held far apart and the head is extended and carried low. The animal moves as quietly as possible, cautiously preventing unnecessary movements. Cough if present is slight, short and evidently painful. The most important diagnostic points are brought out by physical examination.

Percussion early in the first stage may give you a tympanitic note. This can only be observed if the case is seen early. This tympanitic note soon gives way to dullness on percussion which shows the beginning of the stage of red hepatization or consolidation. In the third stage the percussion note tends toward clearing up and in favorable cases returns to normal pulmonary resonance. If the pleura be affected slight percussion over the affected area produces sharp pain.

On auscultation in the first stage we hear an increase of the respiratory murmur, accompanied by crepitant rales. This rale is heard only at the end of inspiration. As consolidation goes on the crepitant rale disappears giving place to bronchial breathing. In the stage of resolution, moist rales return which are coarser than the rales first heard and are known as the crepitus redux.

If pleurisy with effusion takes place at any stage of the disease the respiratory symptoms will become aggravated. The dyspnoea already present will be changed to orthopnea. Symptoms of cyanosis will begin to show themselves. It is obvious that if you have fluid at the base of a lung that is already affected by an inflammation of high grade the difficulty in breathing will become more marked. Hence the recognition of a pleurisy with effusion (no matter how slight the effusion) should be noticed at once.

The urine has the characteristics of ordinary febrile urine, high specific gravity and usually alkaline in reaction. Albumen may be present and the chlorides will be found to be markedly diminished.

The fever is typical remaining high from the onset with very slight morning remissions. It remains so for five or six days and in favorable cases declines, recovery usually taking place in from ten to fourteen days. The termination is usually abrupt resembling crisis. The cough becomes looser, the respirations less rapid, the pulse slower and fuller. The animal regains its appetite and shows all the symptoms of returning health.

In rare cases the disease may be arrested in the stage of red

hepatization, in these abortive cases the disease may last only two to three days.

In fatal cases, especially in cases of the typhoid variety, symptoms of general blood dissolution manifest themselves. Oedema of the lungs sets in and death due to heart failure comes on.

The *prognosis* of croupous pneumonia is favorable in a large majority of cases, unfavorable cases are those presenting the typhoid state and those in which complications develop, especially pleurisy with effusion.

The termination be either in complete resolution, delayed resolution, in chronic interstitial pneumonia, (which occurs either in very young or very old animals, those debilitated by some previously existing disease as bronchitis) by abscess and by gangrene of the lungs, the latter terminations are rare.

Diagnosis.—Croupous pneumonia can be readily diagnosed from catarrhal pneumonia by its clinical course. The sudden onset, the high fever, the physical signs, the termination are all essentially different. The course of catarrhal pneumonia is typical, you have a history of a preceding bronchitis or a toxic agent inhaled, or food articles getting into the air passages, (deglutition or inhalation pneumonia). The fact that catarrhal pneumonia is a double sided disease and the spots of dullness on percussion will be found to be small, difficult to make out and affect only a lobule of the lung. The rales do not disappear in catarrhal pneumonia but remain throughout the disease, nor is the breathing distinctly bronchial. In catarrhal pneumonia we have subcrepitant rales heard both on, in and expiration, whereas in croupous pneumonia we hear a moist rale which is heard only at the end of inspiration.

The diagnosis from pleurisy can frequently not be made as I have already indicated that both fibrinous and pleurisy with effusion are concomitant with this disease. In typical cases the history of the disease, the onset, the fever, the cough and the physical signs will enable one to come to a correct conclusion. In questionable cases the bacteriological examination of

the secretions from the nose and mouth will show the presence of the diplococcus of Fraenkel.

There is no specific treatment for pneumonia, recent experiments by the brothers Klemperer of Berlin, on the production of immunity and for the cure of pneumonia with subcutaneous and intra venous injections of large quantities of filtered bouillon cultures or the glycerine extract of the germ, has produced some remarkable results. Immunity was produced in animals lasting for six months which was transmitted to the offspring born within this period. Still more interesting are the observations upon the cure of the experimentally produced disease. They found that the serum and fluids of the body of an animal which had been rendered immune, had the property not only of producing immunity when introduced into the circulation of another susceptible animal, but actually of curing the disease after infection had been in progress for some time. In infected animals with a body temperature of from 40 to 41 degrees C., the fever fell to normal in twenty-four hours after the injection, of serum of another animal which possessed immunity. They believe that the pneumococcus produces a poisonous albumen, (pneumotoxin) which when introduced into the circulation of an animal causes elevation of temperature and the subsequent production in the body of a substance (antipneumotoxin) which possesses the power of neutralizing the poisonous albumen which is formed by the bacteria.

In man they hold that during the pneumonia process there is a constant absorption into the circulation of this poisonous albumen produced by the bacteria in the lungs. This continues until eventually the same antidotal substance is produced in the circulation that has been seen to occur experimentally. It is then that the crisis occurs. The bacteria is neither destroyed nor is their power to produce the poisonous albumin lessened, but the third factor, the antitoxic element, now exists and neutralizes the toxic substances as they are produced. They demonstrate that the serum of the blood of patients after the crisis of pneumonia contained the antitoxic substance and was

capable, in a fair number of cases, of curing the disease when injected into the infected animals.

While these experiments are still immature, it is nevertheless a decided advance in therapeutics and seem to approach as near as possible to a specific plan of treatment. Further experiments in this line will be awaited with interest by the entire profession.

Knowing then from our present knowledge of Therapeutics what are the main indications for treatment in this disease: First the hygienic surroundings and food of the patient should be carefully looked after. The animal should have an unlimited supply of fresh cold water from the start. A diet consisting principally of bran mashes, scalded oats, (grass, when in season, is preferable if the animal retains an appetite) but if no desire is evinced for food of this particular description, then the animal must be allowed to eat anything that will be taken spontaneously. Corn on the cob is often eaten when everything else is refused. If the horse absolutely refuses to eat it has been found to be good practice to feed him with oat meal preferably (Bethlehem oat meal) and eggs three or four times daily, made into bolus's and given in this manner. The comfort and surroundings of the patient must be attended to. Pure air is essential. Avoid placing the animal in a stall where he may be exposed to draughts of cold air and sudden changes of temperature. It is considered better practice to blanket the animal than to cut off the fresh air and prevent thorough ventilation.

Locally of mustard, turpentine, etc., have been found useful. In regard to blood letting it may be briefly stated that as a systematic course, in croupous pneumonia it should not be resorted to. In young, strong animals, of good stock, if the case be seen early and *only* early local blood letting has some decided advantages, but in older, more feeble animals and those affected by some chronic ailments (bronchitis, emphyzematic,) it should never be practiced. A symptom that often requires special treatment is high fever. This may be treated either locally or constitutionally. Of the local measures, systematic

applications of cold water to the chest will be found useful. Another plan is to give large enemata of cold water by the bowel. This will promptly reduce temperature without depressing the heart, and should be used every couple of hours until the temperature is lowered. Experience advises against the use of analgesic, antipyretics, such as antipyrin, antifebrin, phenacetin, etc., on account of the too depressant effect upon the heart. To add the depressing effect of a powerful drug to the pathological influences already depressing the heart, is now recognized as increasing the danger of cardiac failure which is the most frequent cause of death in croupous pneumonia, while it is true that these drugs unquestionably reduce temperature, they do it at a great risk, and while we have other means of lowering temperature (cold water applications and enteroclysis of cold water) they should not be employed. If any of these drugs be given, phenacetine should be chosen as it has the least depressant effect upon the heart. In reference to the employment of veratrum viride and aconite in the first stage and digitalis at a latter period appears as unreasonable. Cardiac depressants in croupous pneumonia are always of doubtful utility and digitalis as a cardiac stimulant should be given only in response to special indications. Many of the symptoms of pneumonia are due to a toxaemia, and it is far better to bleed the patient if he is to be bled at all, into a basin than into his own vessels. Later in pneumonia when the heart becomes weak, digitalis and alcohol are of decided value. Stimulating expectorants during the third stage have some use, the one having the widest reputation and being by far the one most used is the Carbonate of ammonia. If employed the dose should be frequently repeated as the effect of this drug is soon lost. A powerful respiratory stimulant, when such becomes necessary, is strychnia. This should be administered hypodermically and in full doses. If the cough becomes distressing and painful resource should be had to opium in some form, preferably as Dover's powders. A favorite plan of treatment in human practice consists in giving full doses of quinine early in the disease, followed by a laxative

dose of calomel. Reduction of temperature if it becomes necessary, carbonate of ammonia as a cardiac and respiratory stimulant, control of the fever by means that have already been indicated, digitalis and alcohol if the heart show signs of flagging and the treatment of complications as they may arise.

The disease being the same whether it affects man or animal it seems to me the same treatment might well be practiced in Veterinary medicine.

It must not be forgotten that many cases of pneumonia will recover without treatment (and also in spite of some treatment) and the less we complicate our case by giving unnecessary drugs the clearer will be the course and the symptoms of the disease.

EXPERIMENTS WITH TUBERCULIN ON NONTUBERCULOUS COWS.

By PROF. JAMES LAW, M.R.C.V.S., Cornell University, Ithaca, N. Y.

On October 28th, 1894, the following cows were set apart for this experiment: two Holstein cows, and one Jersey in full flow of milk, being about six weeks after calving, and two dry, farrow cows of common stock, one pointing to a Shorthorn ancestry, and the other to a Devon one. Meanwhile observations on the milk of three other cows, two Holstein's and a Jersey, about the same length of time after calving, afforded a fair comparison between cows treated with tuberculin and others under similar condition, but without such treatment.

The first five cows to be tested with tuberculin, each received in proportion to its size, a full dose of tuberculin weekly, and the temperatures were taken before the injection for the normal standard, and about every two hours from about the ninth to about the twentieth hour after each tuberculin injection.

TEMPERATURES.

The tested animals were treated like the rest of the herd with the single exception, that in order to take the temperatures, they were tied up in the stalls for twenty-four hours on each occasion of testing, while the others were at liberty under an enclosed shed except when tied up for feeding and milking.

The prolonged standing on hard boards, led on each occasion to congestion of the feet of the Holstein cow Mabel which weighed 1455 lbs, but as this invariably took place under similar circumstances, and apart from the injection of the tuberculin, the slight rise of temperature on each occasion of testing is abundantly accounted for from the condition of the feet alone. This conclusion is further confirmed by the fact that in excepting in cases in which she was turned out in the afternoon to relieve her tender feet, the temperature went on steadily increasing to the last, This was victoriously the case in her last tests of the series (November 28th, December, 7th, December 12th). On a previous occasion Mabel had been tested in company with the entire herd, and stood the test satisfactorily. Even in the present series of tests, this cow (with one exception) never rose more than two degrees above her initial temperature taken when that particular test was started, and even she only rose nine-tenths of a degree above 102° F, which may be set down as the normal standard temperature of a cow in full milk, highly fed and kept indoors. Taking into account the variations in healthy cattle from one time of the day to another, this rise of less than one degree above the general standard implies nothing.

The exceptional case was on November 9th and 10th, when Mabel's temperature rose to 104° , and that of the Shorthorn grade to 104.3° . Taken by itself this test might have been misleading, but in connection with six other tests (in case of Mabel seven), made both before and after this, with the same dose of tuberculin, and with no such resulting rise, it can safely be set down to accidental conditions. The real cause was not clearly made out but it is probable that it was chargeable to exposure in a cold draught. Both cows stood on separate ranges close

to the east door of the barn, through which the manure had to be forked out, with a cold east wind entering by that door, and blowing on cattle that had been shut up in a warm building over night, a slight chill was to be expected.

The Jersey Daisy never rose above the normal standard of 102° , excepting in the first test, and then only 102.3° —too little to furnish even a suggestion of tuberculosis, and no higher than we find in many well-fed, healthy cattle.

The Holstein *Belva*, on two occasions rose to 102.5° , half a degree above the normal standard, but which is often attained in health, and apart from the tuberculin test. Moreover on five other tests both before and after these she did not show a rise over 102° so that the less suspicion should arise from this insignificant elevation.

The *Devon grade cow* in different tests had her temperature elevated to 102° , and on one occasion to 102.6° a little more than half a degree above the normal, and which as already said is often found in the healthiest cows.

The *Shorthorn grade* had a fever temperature on one occasion apparently from a chill as already referred to. In her first test it rose to 102.6° as did also the Devon grade on the same occasion. This may be explained partly by the fact that both had been driven a distance of seven miles the day previous, causing much excitement, and followed by the excitement induced by coming into a new place, and bred among new people.

One other point should be named as affecting the temperature of all the test animals in the early forenoon and late afternoon. The whole herd was put in the barn for feeding and milking, from five to seven in the morning, and from three to six in the afternoon, so that at these hours the place was crowded and the disturbance greater. Elevations of temperature of a degree, and under occurring at such times, and as repeatedly seen in the tested animals are thus accounted for. Such elevations do not show the persistence, and the slow gradations of rise and fall which we usually see in the rise caused by the tuberculin.

Taken all in all then there is nothing in the indications of temperature that would indicate, either at the time of the test, or later, that the tuberculin had proved in any way inimical to the general health. Had the health been impaired by the repeated operation of the tuberculin it might have been expected that the constitutional disturbance would have been more distinctly marked in the later tests than in the earlier ones, and as no such tendency is observable it may be safely concluded that so far as illness can be indicated by a variation of temperature tests doses of tuberculin, in the absence of the bacillus, does not seem to produce any such illness in the healthy animal.

It has been alleged that the repeated use of tuberculin on animals slightly tuberculous, abolishes the tendency to reaction under the use of this agent. If this were true it would argue rather a curative than a malific action of the tuberculin, but in other experiments, I have found the second test made a week or more after the first to produce a no less marked reaction so that this alleged tolerance need not be taken into account in the cases before us.

RESPIRATION AND PULSE.

As regards the record of the pulse and breathing given in the tables it is sufficient to say that they furnish no real indication of a deviation from the most perfect health. In cattle pulse and breathing vary so widely under different conditions of the environment, digestive organs, exercise etc., that it would take very much greater variations than those given in the tables to give true indications of disease.

MILK RECORD.

The milk record may be accepted as a more sensitive test of constitutional injury than temperature, breathing or pulse. It is also farther reaching than these other indications, as it involves a healthy exercise of all the bodily functions, and above all those of appetite, digestion, assimilation and secretion. An appreciable disturbance of the health at any one point will usually be manifested in this delicate balance, in a variation of quantity or quality of the milk.

Belva. Taking the milk record of Belva as given in table VI; we find that the milk yield in the twenty-four hours following the injection of the tuberculin shows no constant nor striking difference from that of intervening days. The highest yield per day (42.25 lbs) was on the fifth day succeeding the third injection of tuberculin, and on each of these five days the yield was from two to five pounds above the average. The lowest yield per day (31.5 lbs) was on the fourth day after the first injection, while the preceeding days yield had been over a pound above the average, and the two days following the injection had been respectively two and three pounds below.

What is more significant is that the average yield of milk for the days following the seven injections of tuberculin is practically the same as the average yield for the whole forty-seven days included in the experiment. This may be stated clearly in tabular form thus:

Average of the seven days following the injections of tuberculin 37.257 lbs. Average of the forty-seven days for which the milk record is given 37.247 lbs. The difference is 0.01 lb, and is in favor of the days when the system was charged with the dose of tuberculin.

Daisy. The milk record of Daisy given in table VII, shows a great difference in the yield on different days, but no constant relation between the low daily yield and the days when the tuberculin was in the system. On the first, second, and fourth occasions in which the system was charged with the tuberculin the milk yield was above the average, whereas on the third, fifth, sixth and seventh occasions it was below. The highest daily yield (22.25 lbs) was on the day in the evening of which the first injection of tuberculin was made, and the second highest (21.25 lbs), only $\frac{3}{4}$ of a pound less was on the day after that injection. The lowest daily yield (15 lbs) was on the day when the last injection of tuberculin was in the system, and when besides the cow was in *heat*. This low yield was also reached on the day preceeding the second last tuberculin injection (the ninth day after an injection), and also on the succeeding day when the

system was charged with this second last injection. This low record could not be justly charged on the tuberculin injection seeing that it was already reached the day before that injection.

Daisy like the rest of the herd was falling off in milk during the experiment, and her average when charged with tuberculin suffers on account of her having reached her lowest mark on December 7th, on the evening on which a dose of tuberculin was given, and further, that on December 13th, the day of the last test her milk shrunk because she was in heat. Taking the seven tests the arrays stand thus: Average of the seven days following the injections of tuberculin 17.82 lbs. Average of the forty-seven days for which the milk record is given 18.26 lbs. This shows a difference of less than half a pound daily on the average against the tuberculin. If we leave out the last injection (December 13th) when the cow was in heat, we find that the average yield per diem for the next six days during which the cow was charged with tuberculin is slightly above the average for the whole forty-seven days of the trial.

Molly, Freda and Bertha. These cows were not injected with tuberculin, and their milk records have been introduced to show that the daily oscillations in the yield, and its progressive diminution in the main during the forty-seven days, was common to the whole herd, and in no sense peculiar to the three cows that had been treated with tuberculin. The gradual failure can be seen in the tables. It may be more clearly shown by placing side by side the general average for the first four weeks, and the average for the last two weeks and five days.

Average for first twenty-eight days,

BELVA	MOLLY	FREDA	DAISY	BERTHA.
lbs.	lbs.	lbs.	lbs.	lbs.
38.10	41.31	43.51	19.23	28.46

Average for the last nineteen days,

lbs.	lbs.	lbs.	lbs.	lbs.
36.00	42.87	40.51	16.76	26.13
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
2.10	1.56	3.00	2.47	2.33

Molly has gone on improving, but the others show a very decided falling off which is greater in the noninjected Freda than in the injected Daisy, and greater in the uninjected Bertha than in the injected Belva.

Oscillations. The variations above and below the general average for each animal injected and not injected with tuberculin would be very clearly seen by glancing at the tables giving the graphic illustration for two Holstein's and two Jersey's, and which in figures may be shown as follows :

			lbs.			lbs.		lbs.
BELVA,	General average per day		37.247	Highest per day		42.25	Lowest	31.50
FREDA,	"	"	41.78.	"	"	57.50	"	34.50
DAISY,	"	"	18.26.	"	"	22.25	"	15.
BERTHA,	"	"	27.01.	"	"	23.5.	"	23.
MOLLY,	"	"	41.19.	"	"	48.	"	33.5.

The extreme it will be observed were actually greater for the cows that were not treated with tuberculin than for those so treated. Among the Holstein's, *Belva* had a variation amounting to 10.75 lbs., *Freda* one of 13 lbs., and *Molly* one of 14.5 lbs. Among the Jersey's, *Daisy* had a variation of 7.25 lbs, and *Bertha* one of 10.5 lbs. Extreme variations in the yield of milk then cannot be charged on the action of a test dose of tuberculin injected into a healthy animal, nor of a series of such test doses administered at intervals of a week.

PERCENTAGE OF BUTTER-FAT IN THE MILK.

Before dismissing the milk it is desirable to consider how the ratio of butter-fat, is affected by repeated test doses of tuberculin injected into a healthy animal. A study of the tables given below will fail to establish any connection between the presence of a test dose of the tuberculin in the animal body, and any increase or diminution of the fat in the milk. The Holstein *Belva* had the highest percentage of butter-fat (3.6) October 20th, ten days before the first injection of tuberculin. Her next highest record (3.4) was December 8th, while under the action of tuberculin. Her lowest record (2.8) was December 1st. two days after the operation of a dose of tuberculin. Her variation (0.8)

is only a little more than that of the untreated cow Freda (0.6), and only about half that of Molly (1.5); the Jersey *Daisy* also made her highest per centage (5.6) October 20th, and her lowest (4.9) December 8th, when under the action of tuberculin. But she made her second highest (5.55) November 10th, when under tuberculin, and an equal record November 17th, two days after the operation of a dose of tuberculin. Her greatest variation was 0.7%, while that of the untreated cow Bertha was 1.15%.

There is therefore no change in the percentage of butter-fat sufficient to indicate any disease or ill-health as the result of the administration of repeated test doses of tuberculin.

EFFECT ON BODY WEIGHT.

The weight of the animals varied so little during the experiment that it might be said to have remained stationary. The record is as follows :

	Oct. 30th,	Dec. 1st,	Dec. 13th, 1894,	Jan. 5th, 1894.
BELVA,	1264 lbs.	1300 lbs.		1404 lbs.
MABEL,	1455 "	1540 "		1405 "
DAISY,	945 "	950 "		965 "
GRADE SHORTHORN,		1020 "	1020 lbs.	1026 "
GRADE DEVON,		895 "	915 "	910 "

Considering that a variation of 50 lbs. in the weight of a cow may occur in a few hours according as it is taken before or after feeding and watering or milking, there may be said to have been no change excepting in the case of the two Holstein's, in which there is shown a gain of 141 lbs. and 115 respectively. It is worthy of notice that the last weighing, which makes the highest record was made three to four hours after the morning feeding, and (in the case of the three first cows) of the morning milking. The two dry cows had been watered but had not been fed on the morning of the last weighing as they were just about to be killed.

It may be concluded that the repeated test doses of tuberculin had in no injurious way affected assimilation, and that in

the two Holstein cows, it had not prevented a perceptible improvement in this respect.

POST MORTEM EXAMINATIONS.

To complete the record the two farrow cows were killed December 5th, 1894, and subjected to careful necropsy. In the main the viscera were sound. The shorthorn grade had pus in each of the left quarters of the mammary gland in the milk sinus, the walls of which were red and thickened.

When strained and placed under a microscope the pus showed numerous cocci but no bacilli.

As is usual in old cows, the groups of lymphatic glands in the intermaxillary and pharyngeal regions, on the chest, the abdomen, the subcutaneous and intermuscular regions were pigmented of a dark grayish color, varying at different points but in no case showing molecular degeneration, coagulation necrosis (caseation) nor even perceptible congestion. In the shorthorn grade the lymphatic glands behind the diseased mammae was considerably enlarged.

EXPERIMENTS AT THE UNITED STATES BUREAU OF ANIMAL INDUSTRY.

In the investigations concerning bovine tuberculosis, 1894, Dr. Schweinitz records the effect on the milk of the two healthy cows, one of which received one dose, and the other three successive doses of tuberculin. The dose in each occasion was 2 c. c., for each cow, and as they were common stock it may be inferred that it was a full dose considering the probable weight of the animals. Of variations in temperature it is enough to say that there was no more than would occur in the best of health. The analysis of the milk is given in table X from which it will be seen that in the single test of cow No. 113, there was a slight reduction of the total solids, and of the different constituents such as sugar, albuminoids and fat. The second cow No. 217 tested three times under tuberculin, and once on five successive days without tuberculin gives a more trustworthy

basis for estimating the effect of that agent. It will be observed that on April 1st, under the tuberculin there was a slight decrease of the total solids (0.45), on April 13th, under tuberculin a still larger decrease (1.56), but on June 5th, under tuberculin there was an increase (1.01). On June 11th to 15th, without tuberculin there was a variation in the total solids of (1.99).

Then as to the milk, sugar, 219 showed a percentage reduction of .01 April 1st, under tuberculin, and of .61 April 13th, but no change whatever June 5th though again under tuberculin, and no change June 11th to 15th without tuberculin.

Of albuminoids 217 showed a percentage reduction of .07 April 1st under tuberculin, but an increase of .13 April 13th, and of .61 June 5th.

In fat, No. 113 had a decrease in her single test, while 212 had an increase in all cases under tuberculin .31 April 1st, .13 April 13th and .82 June 5th. In her entire absence of tuberculin June 11th to 15th, she showed a variation of .51.

With such a testimony it would be disingenious to claim any constant or appreciable variation as the result of the injection of a test dose of tuberculin, into a healthy animal, even if such doses were repeated several times. So far as there is evidence before us, everything points to the harmlessness of a single test dose on a sound animal system.

TABLE .

ACTION OF TUBERCULIN ON HOLSTEIN COW BELVA IN FULL MILK.

Calved, September 16th, 1894.

AFTER INJECTION.

DATE 1894.	NORMAL TEMP.	RESP.	PULSE.	DOSE TUBERC.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.
Oct. 30-31.	101°			30 m.	9.45 p.m.	102.1°			6.45 a.m.	101.5°	30	72	9.15 a.m.
Nov. 9-10.	101.8°			30 m.	10 p.m.	101.8°	16		7 a.m.	100.2°	13		9.30 a.m.
" 14-15.	101°	15		30 m.	10.30 p.m.	101.6°	18			100.8°	10		4 p.m.
" 23.	101°	24		30 m.	7 a.m.	101.5°	16		2.30 p.m.	101.6°	21		9.15 a.m.
" 28-29.	100°	13		30 m.	10.15 p.m.	101.8°	18		7 a.m.	100.5°	14		10 a.m.
Dec. 7-8.	101.5°	20		30 m.		101.9°	21	72	7.30 a.m.	100.4°	12	72	10.15 a.m.
" 12-13.	100.8°	20	63	30 m.		101.5°	10		7.15 a.m.	101.4°	10		

Continued.

TEMP.	RESP.	PULSE.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.	TEMP.	PULSE.	HOUR.
101.5°	30	60	11.25 a.m.	102.5°	15		1.45 p.m.	101.9°	20	4.15 p.m.
101.5°	16			101.7°	17		2 p.m.	101.4°	18	4 p.m.
101.2°	17			101.5°	15		1 p.m.	101.8°	13	3 p.m.
101°	16		7 p.m.	101.9°	20	60	10 p.m.	102.5°	14	4 p.m.
100.9°	20	60	11.45 a.m.	101.8°	16	60	2 p.m.	101.6°	20	4.45 p.m.
101.3°	16	60	12.10 p.m.	101.6°	18		3 p.m.	101.7°		4.30 p.m.
			12.15 p.m.				2.15 p.m.			
								Was in heat December 11th.		

TABLE II.

TABLE IV.

ACTION OF TUBERCULIN ON GRADE SHORT-HORN COW: NEARLY DRY; FARROW.

AFTER INJECTION.

DATE 1894.	NORMAL TEMP.	RESP.	PULSE	DOSE TUBERC.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.
Nov. 3	100.8°			28 m.	6.30 a.m.	101.2°	20	72	2 p.m.	102.3°	17		4 p.m.
" 9-10	102.70			29 m.	10 p.m.	104.3°	30	48	7 a.m.	103.7°	22		9.15 p.m.
" 14-15	101°	16	54	28 m.	10.30 p.m.	101°	20			101.7°	20	56	9.30 a.m.
" 22-23	100.6°	21		28 m.	10.20 p.m.	100.8°	25			102°	22	54	
" 28-29	101°	16	43	28 m.		101.3°	20	44		102°	16	48	9.15 a.m.
Dec. 7-8	101.5°	22	48	28 m.		100.5°	23	50	7.30 a.m.	101°	22	42	10 a.m.
" 12-13	101.6°	30	60	29 m.		101.9°	18		7.15 a.m.	102.3°	17	52	10.15 a.m.

Continued.

TEMP.	RESP.	PULSE.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.	TEMP.	RESP.	PULSE.	HOUR.
102.6°	17		5.15 p.m.	102°	21	48	7 p.m.	101.3°	13	45	9 p.m.	101.5°	42	48	10.15 p.m.
103.8°	18		11.20 a.m.	102.8°	18		2 p.m.	102°	22		4 p.m.	101°	16		6.45 p.m.
101°	15	50		101.5°	13	42	1 p.m.	101.5°	16	54	3 p.m.	102°	16	54	5 p.m.
102°	15	60	11.30 a.m.	101.6°	18	60	2.30 p.m.	102.4°	20	48	4 p.m.				
101.0°	15	48	11.45 a.m.	101.5°	18	52	2 p.m.	101.5°	16	46		102°			
101.3°	16	58	12.10 p.m.	102°	16	50	3 p.m.	101.6°	18		4.45 p.m.				5.30 p.m.
101.7°	18	52		101.8°	24		2.15 p.m.	101.8°			4.30 p.m.				

TABLE V.

ACTION OF TUBERCULIN ON GRADE DEVON COW: DRY: FARROW.

AFTER INJECTION.

	NORMAL TEMP.	RESP.	PULSE	DOSE TUBER.	HOUR	TEMP.	RESP.	PULSE	HOUR	TEMP.	RESP.	PULSE	HOUR
Nov. 3	101.5°			28	6.30 a.m.	101°	18		2 p.m.	102.3°	17		4 p.m.
" 9-10	101.7°			27	10 p.m.	101.8°	24	60	7 a.m.	102.1°	12		9.15 a.m.
" 14-15	101.5°	18	62	26	10.30 p.m.	102.2°	22	48		102.2°	18	50	9.30 a.m.
" 22-23	100.5°	14		27	10.20 p.m.	101°	15			102°	11	48	
" 28-29	101.5°	11	50	27	10.15 p.m.	102°	16	42	7.30 a.m.	101.2°	11	42	9.15 a.m.
Dec. 7-8	101.5°	16	60	27		101.8°	23	60		102.3°	24	60	10 a.m.
" 12-13	101°	13	48	27		101.7°	14	43	7.15 a.m.	101.1°	17	48	10.15 a.m.

Continued.

TEMP.	RESP.	PULSE	HOUR	TRMP.	RESP.	PULSE	HOUR	TEMP.	RESP.	PULSE	HOUR
102.6°	18		5.15 p.m.	102.6°	14	70	7 p.m.	101.9°	14	64	9 p.m.
102.2°	11	46	11.20 a.m.	101.4°	16		2 p.m.	101.4°	14		4 p.m.
102°	18	44		101.3°	14	48	1 p.m.	101.7°	16	40	3 p.m.
102.2°	10	43	11.30 a.m.	101.8°	18	48	2.30 p.m.	101.5°	12	40	4 p.m.
102°	16	58	11.45 a.m.	101.2°	14	48	2 p.m.	101°	18	46	4.45 p.m.
101.3°	14	44	12.10 p.m.	101.8°	16	54	3 p.m.	101.6°	14		4.30 p.m.
				101.5°	16		2.15 p.m.	101.6°			

CALV

Oct. 2
" 2
" 3
Nov. 3

Milk

DAISY CA

Oct. 2
" 2
" 3
Nov. 3

TABLE VI.

Milk record of Belva for the period of the tuberculin test, and of two other Holstein cows in similar conditions apart from the test.

BELVA CALVED SEPT. 16,		MOLLY CALVED OCT. 4.	FREDA CALVED AUG. 28.	BELVA CALVED SEPT. 16.		MOLLY CALVED OCT. 4.	FREDA CALVED AUG. 28.
	LBS.	LBS.	LBS.		LBS.	LBS.	LBS.
Oct. 28,	40. 5	42.25	44. 5	Nov. 23,	38. 5*	43. 5	37.75
" 29,	39.75	42.25	44. 5	" 24,	37.75	40	37. 5
" 30,	40. 5	42.25	44. 5	" 25,	36.25	38	34. 5
" 31,	35*	37. 5	45.25	" 26,	34.25	38. 5	35.25
Nov. 1,	34. 5	40.75	36	" 27,	36.25	41	37. 5
" 2,	38. 5	42. 5	41.75	" 28,	35	41	36.25
" 3,	31. 5	34.75	40.25	" 29,	35*	41	39
" 4,	37	34.75	42.75	" 30,	34.75	41.5 served	41.25
" 5,	32	33. 5	40. 5	Dec. 1,	35. 5	42. 5	42.25
" 6,	36	35.75	41. 5	" 2,	33.75	42	41. 5
" 7,	35.15	37	45.75	" 3,	35.75	41. 5	42.25
" 8,	38.25	40. 5	47. 5	" 4,	34.75	38.75	40
" 9,	38	40. 5	46	" 5,	38.25	42.25	43.75
" 10,	38*	41.25	43. 5	" 6,	39	42.75	44.75
" 11,	39	41. 5	42. 5	" 7,	38. 5	43.75	45
" 12,	36.75	40.75	41.75	" 8,	34.75*	43.25	42.75
" 13,	41.25	45. 5	45	" 9,	37.25	43.25	42
" 14,	41. 5	42.25	47	" 10,	37.25	41.25	41. 5
" 15,	41.25*	46. 5	45.75	" 11,	35.75	41. 5	40
" 16,	39. 5	43. 5	42	" 12,	34.25	42.25	40. 5
" 17,	40.75	45	43.75	" 13,	37.25*	43	39. 5
" 18,	41	45	43.25				
" 19,	42.25	48	43.25				
" 20,	38	42. 5	42				
" 21,	37.25	43	41. 5				
" 22,	37.25	44. 5	37 served				

* Indicates the 20 hours following the different tuberculin injections.

TABLE VII.

Milk record of Daisy during the period of the Tuberculin test, and of another Jersey cow under similar conditions apart from the test.

DAISY CALVED SEPT. 12TH.		BERTHA CALVED SEPT 17,		DAISY CALVED SEPT. 12TH.		BERTHA CALVED SEPT. 17.	
	LBS.		LBS.		LBS.		LBS.
Oct. 28,	20.75	Oct. 28,	29.25	Nov. 23,	18. 5*	Nov. 23,	26. 5
" 29,	20.75	" 29,	27.75	" 24,	17	" 24,	25. 5
" 30,	22.25	" 30,	29.75	" 25,	17	" 25,	26
" 31,	21. 5*	" 31,	26.	" 26,	18	" 26,	23. 5
Nov. 1,	19	Nov. 1,	27.75	" 27,	17	" 27,	23, served
" 2,	20.25	" 2,	27.25	" 28,	19	" 28,	23
" 3,	19	" 3,	26	" 29,	18*	" 29,	24.25
" 4,	20. 5	" 4,	26.75	" 30,	17	" 30,	23
" 5,	17.25	" 5,	24.75	Dec. 1,	17	Dec. 1,	24. 5
" 6,	19.75	" 6,	24	" 2,	19	" 2,	26
" 7,	17.75	" 7,	26.25	" 3,	16	" 3,	25. 5
" 8,	19. 5	" 8,	30.25	" 4,	17	" 4,	24
" 9,	21	" 9,	30.25	" 5,	16	" 5,	26. 5
" 10,	19.25*	" 10,	28	" 6,	17	" 6,	26
" 11,	17	" 11,	27. 5	" 7,	15	" 7,	28.25
" 12,	18. 5*	" 12,	28. 5	" 8,	15*	" 8,	27. 5
" 13,	20	" 13,	29.75	" 9,	17	" 9,	27
" 14,	19	" 14,	27.75	" 10,	15.75	" 10,	24.25
" 15,	17. 5	" 15,	29	" 11,	16.75	" 11,	26.25
" 16,	19.75	" 16,	32. 5	" 12,	17	" 12,	27
" 17,	18.25	" 17,	33. 5	" 13,	15* served.	" 13,	26.75
" 18,	19. 5	" 18,	30				
" 19,	17. 5	" 19,	30.75				
" 20,	20. 5	" 20,	25. 5				
" 21,	18	" 21,	30				
" 22,	19.25	" 22,	27				

* Tuberculin in system; the day following injection.

TABLE VIII.

Percentage of Butter-fats in milk of Belva during experiment, also in Holstein cows, Molly and Freda not injected.

	BELVA.	MOLLY.	FREDA.	
Oct. 20th,	3.6%	4.9%	3.2%	Three days before first injection of tuberculin. Three days after tuberculin injection. Under tuberculin ; injected night before. Two days after tuberculin. One day after tuberculin. Two days after tuberculin. Under tuberculin ; injected night before.
" 27th,	2.85%	3.85%	3.5%	
Nov. 3d,	3.2%	4.25%	3.55%	
" 10th,	3.2%	3.8%	3.35%	
" 17th,	3.3%	3.75%	3%	
" 24th,	2.0%	3.65%	3.3%	
Dec. 1st,	2.8%	3.95%	2.95%	
" 8th,	3.4%	3.4%	3.1%	

TABLE IX.

Percentage of Butter-fats in milk of Daisy during Tuberculin experiment, also of Jersey cow Bertha not injected.

	DAISY.	BERTHA.	
Oct. 13th,	5.1%	4.8%	Three days before first injection of tuberculin. Three days after tuberculin injection. Under tuberculin ; injected the night before. Two days after tuberculin. One day after tuberculin. Two days after tuberculin. Under tuberculin ; injected the night before.
" 20th,	5.6%	4.45%	
" 27th,	5.1%	5.5%	
Nov. 3d,	5.3%	5.5%	
" 10th,	5.5%	5.3%	
" 17th,	5.5%	5.4%	
" 24th,	5.4%	4.25%	
Dec. 1st,	5.05%	5.1%	
" 8th,	4.9%	4.85%	

TABLE X.

Percentage variation in the Constituents of the milk of Healthy Cows under a test dose of Tuberculin.

ANIMAL.	DATE.	TOTAL SOLIDS.	SUGAR.	ALBUMINOIDS.	FAT.	ASH IN MILK.	ACIDITY LAC-TIC ACID.	
No. 113	March 31,	11.01	4.17	3.26	2.54	.775		Before Injection
" "	April 1,	10.69	3.84	3.20	1.52	.696		After " "
" 217	March 31,	10.83	4.17	2.96	2.23	.723		Before " "
" "	April 1,	10.38	4.16	2.89	2.54	.700		After " "
" "	" 12,	11.03	4.17	1.26	2.56	.681		Before " "
" "	" 13,	9.77	3.37	1.39	1.53	.727		After " "
" "	May 31,	12.03	4.16	2.82	2.43	.711		Before " "
" "	June 1,	10.25	4.16	2.29	1.27	.666		After " "
" "	" 5,	11.26	4.16	2.70	2.03	.688	.176	After " "
" "	" 11,	11.97	4.16	4.17	2.03	.590		No " "
" "	" 12,	10.82	4.16	3.83	1.52	.692		" " "
" "	" 13,	11.30	4.16	3.97	2.02	.751		" " "
" "	" 15,	11.62	4.16	4.25	2.03	.767		" " "

REMARKS ON SOUTHERN CATTLE FEVER.

BY W. H. HARBAUGH, V. S.

(Read before the Virginia State Veterinary Medical Association, Charlottesville, Va.,
January 3, 1895.)

Texas fever, Southern cattle fever, or, as it is better known to the public in this State, murrain or bloody murrain, is a subject of vast importance to every member of this association, as we all reside and practice either within the territory designated by the United States authorities as the permanently infected district, or close to the so-called line of the infected district, where cases of the disease are liable to occur at any time during the season of the year the fever manifests itself, and we are therefore called upon to treat the disease as practical veterinarians, not as investigators or theorists.

The cattle owner does not care how well we are read up on the subject; the difference in opinion as to the real cause of the malady is nothing to him; his animal is suffering with a disease generally supposed to be fatal, and he wants it relieved. We are called upon to relieve it, and we must do our best under the circumstances, or else acknowledge that we do not know enough about this particular disease to attempt treatment. That the disease is the least understood and the most generally misunderstood by the profession at large, and the public as well, there can be no doubt, but it by no means follows that the treatment is hopeless, as I will endeavor to demonstrate later on.

Many of the erroneous ideas in regard to the malady are the direct result of veterinary writers who, knowing nothing of the subject themselves, depend on the writings of others for their knowledge, and usually fail to understand what they read. As an example of such ideas, I will quote from an article in the December REVIEW:

"The microparasite is always present in Southern cattle, even if they have been away from the Southern pastures for a few years.

"All Southern calves go through a natural inoculation by the ticks, at which age

the death-rate is very small; when I say all Southern calves, I think I am right, as the ticks are pretty well scattered all over the territory, when the winter is not severe enough to destroy them."

The points which I particularly desire to call your attention to at this meeting are the following:

(1) The whole territory known as the permanently infected district is not infected. There are farms and sections of counties within this so-called infected area, which are as free from infection as any place North of the Potomac.

(2) All Southern cattle are not dangerous. There are cattle raised on certain farms in the South as free from the disease as if they had been raised in any Northern State, and when these cattle are taken to other farms, perhaps but a mile or two distant from where they were born and raised, they contract the disease.

(3) All Southern ticks are not dangerous. Right here in the so-called permanently infected district, there are farms where ticks are on cattle at all times, and when cattle are put on the farms from outside the infected district, no harm has resulted.

(4) All acute cases of the disease are not hopeless ones to treat. Mild ones are favorable, and frequently recover without any treatment, and often in spite of the most atrocious treatment.

Before proceeding further, I wish it to be well understood that I am not here to criticise the work of the Bureau of Animal Industry. On the contrary, I am of opinion that the work of the Bureau stands unequalled by any similar body the world over, and should receive the hearty support and encouragement of every veterinarian who has at heart the interest of this country and his profession. But that there is room for honest difference in opinion on this subject is unquestionable, and, in fact, if you will carefully read the special report on Texas fever, you will be informed by the investigators of many doubts which they freely point out.

I will also say here that so far as the disease is concerned, in my opinion, the only works of practical importance to us as

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veterinarians are the reports of the United States Agricultural Department and the Bureau of Animal Industry, beginning with special report No. 22, 1880.

I had my first serious outbreak to contend with in the fall of 1886, on the farm of Col. A., in Chesterfield County. Many of this herd were born and raised on the farm, others were brought from Maryland and other States, added from time to time as the owner secured valuable animals to improve his herd.

About twenty of the cattle were effected with the disease, either in the mild or acute types. About six died, including a noted cow, which cost her owner \$3,250.00. From the first I did not hesitate in my diagnosis of Texas fever. Post mortem examinations confirmed my opinion. My standard authority was Dr. Salmon's article on the subject, in special report No. 22. The history, symptoms and post mortem lesions, as given in that article, are to-day the best extant for the general practitioner so far as I know.

Col. A. would not believe that the cattle were affected with Texas fever, because they had no ticks on them. Thorough search was made for ticks, but none were found. The cattle stable was a clean, well kept place, thoroughly ventilated and drained. The cows were cleaned daily, and when I tell you that they were cleaned with a curry-comb and brush, and with water and soap, if necessary, you will understand what I mean by saying they were cleaned daily. You will also probably understand why no ticks could be discovered on them.

This was my first experience with the tick theory, which I did not believe, and, as a consequence, I was both amused and annoyed by the Colonel's obstinacy in regard to it, because, at that time, all I knew about the disease I learned from special report No. 22, in which Dr. Salmon says:

"One of the most widely spread opinions in regard to the causation of Southern fever is the pathogenic influence of the ticks with which Southern cattle are generally covered, and which migrate in large numbers to the bodies of other cattle with which they mix. But the acceptance of this view is simply an evidence of the desire of the human mind to explain the origin of mysterious phenomena. The same principle is exhibited in the popular views regarding the pathogenic nature of hollow-

horn, hollow-tail, wolf-teeth, black-teeth, hooks, etc., none of which have the least foundation in fact or reason. The tick theory scarcely explains a single one of the many peculiar phenomena of the disease. Ticks are not kept from cattle by a fence. They are found everywhere, but are simply more numerous at the South. Their attacks are not confined to the latter half of the summer; nor would they be likely to remain on a pasture from spring to August without doing harm, and then suddenly cause an outbreak of the disease. Again, the post mortem examination plainly indicates the cause of the disease to be an agent taken into the circulation, and causing the most important changes in the composition of the blood."

The foregoing disposal of the tick theory by Dr. Salmon in 1880 has much to commend even now, in 1895, notwithstanding the recent discoveries by the Bureau Investigators, in which the tick has occupied a prominent position.

My ideas in regard to the cause of the disease were also taken from special report No. 22, in which Dr. Salmon says: "It may be doubted if the fever would attack animals unless they had eaten grass which had been soiled by the excretions of the Southern animals, or, at least, which had been so near these excretions as to be contaminated by them."

Now, this idea of the cause was fully supported by the circumstances connected with the outbreak in Col. A.'s herd. Up to this outbreak there never had been a case on the farm known to any one connected with it. Many of the cattle were born and raised on the place, while cattle from the North were put on the farm at frequent intervals with no bad results. A few weeks before the outbreak some strange cattle broke through the fence and had pastured half way of the field in which the herd was grazing before they were discovered and put out. This was the only way that field could have been infected. Of course ticks could have been dropped on the pasture by these strange cattle, but, as I said before, none were found on Col. A.'s cattle. I, of course, attributed the infection to the excretions of the strange cattle.

After the outbreak of the disease, the herd was removed from the pasture to the stable and stable lot, where it was kept until after cold weather set in. In this outbreak the disease attacked young and old, cows that were born and raised on the place, as well as animals from the North.

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I fully believe that cattle born and raised on an infected farm acquire immunity from the disease, and I am quite sure that such immunized cattle convey the infection to non-infected pastures, and it is by this means only that the infected area is extended or perpetuated.

Cattle born and raised on a non-infected farm, sicken and probably die when put on an infected farm, although the infected farm may only be on the other side of a fence, or on the opposite side of a road.

So far as I know there is but one way to tell an infected farm from a non-infected farm, and that is by testing the pastures in the proper season by placing on them cattle from a farm known to be non-infected.

Richmond City and the adjoining counties have been within the so-called infected area since the line was mapped out, and that there are many non-infected farms and sections in the vicinity is proved by the fact that hundreds of cattle born and raised on these farms die annually when brought to Richmond and turned out to pasture on the commons during the day, where they contract the disease.

Animals placed in a dairy stable, where the cattle are stalled entirely and only have the run of a yard wherein there is no grazing, neither infect others nor are liable to infection no matter where they are born and raised.

To better illustrate some of the points I have called your attention to, I will read a letter from Mr. W. E. Grant.

Grantland, Va., December 13th, 1895.

Dr. W. H. Harbaugh,
Richmond, Va.

Dear Sir:—Your letter of the 12th inst. to hand. I have never seen a case of Southern fever, except at Colonel ———, where you were then in attendance. As you know, my place is above, and on the opposite side of the James River. I have never heard of a case in my immediate neighborhood, though on the opposite side of the river, I have heard great complaints of sickness (of this nature, I suppose). Cattle which I have sold to go to Chesterfield have died, though in perfect health when I delivered them.

I have brought cattle to my place from the mountains of North Carolina and Virginia, New York, Pennsylvania, Holland, and almost direct from the Island

of Jersey. I would not hesitate to hiring cattle from any place on the face of the earth to my farm if healthy at the time of removal. I have often seen ticks on my cattle, but am not aware that they did any especial injury.

My farm is fenced, but other people's cattle often get in with mine (I don't like to own it, but mine sometimes return their visits).

My cattle are out in the pasture every day in the year, unless there is falling weather, or it is extremely cold. I have been and am very careful that my cattle shall never have access to stagnant water. This is the only precaution I have ever deemed necessary.

James River is practically an insurmountable barrier between the two counties; therefore I know very little about Chesterfield Co., but I have always understood that cattle in that county had but few restrictions placed upon them. It is unfortunate that so large a portion of the U. S. should be placed under a band, simply because a few places within that limit have been found unhealthy.

Yours truly

(Signed) W. E. GRANT.

Mr. Grant is a well-known gentleman, a reliable and practical breeder of Holstein and Jersey cattle, and implicit confidence may be placed in his statement. His farm Grantland, is about five miles west of Richmond, in Henrico County, and in the so-called permanently infected district.

You must bear in mind that within the so-called infected area, a cow born and raised on an infected farm, although insusceptible to the disease, and apparently healthy in every respect, will infect a non-infected pasture by grazing in it. And that a cow born, and raised on a non-infected farm will contract the disease while grazing on an infected farm, and that an infected field may adjoin a non-infected field.

These are curious facts, but facts that are as well known to the practitioner, as the unmistakable symptoms of the disease. Of course there may be isolated instances which might be quoted as exceptions.

It is not my intention to occupy much of your time with the tick theory. I do not question any of the discoveries made by the Bureau Investigators, as far as they go, but you must remember that those experiments were conducted outside the so-called infected area, and seemingly with the object of connecting the tick with the cause of the disease.

Important as are their discoveries, there are many missing links, and while they have placed about all the responsibility on the tick at the experiment station, I am still of opinion that there are other factors, as important, if not more so, in the so-called infected area where the disease occurs seemingly without ticks, and where it does not occur in spite of ticks.

However the tick theory should not be discarded. It should be carefully considered and intelligently understood, and if your observations in practice support it, you should not hesitate to confirm it as one of the factors that spread the infection in this state. More good can be done by assisting the Bureau in its efforts to solve doubtful points than by placing obstacles in its way, or by trying to prove it wrong.

(To be continued.)

HYDROPHOBIA.

BY J. H. ADAMSON, D.V.S., Charlottesville, Va.

(Read before the Virginia State Veterinary Medical Association.)

(Concluded.)

In the earlier stages, sexual excitement is usually a prominent symptom, both in animals and in man. When a rabid dog is at large, and is noticed trotting along in the characteristic straight line, he always alters his course (when compelled) by turning at right angles, and never deviates from this rule unless driven to it by a furious mob. When he reaches any article, he does not think of going out of his path to clear it, will pass through a hedge or ditch, or attempt to climb over it or under it, never giving up until he is completely exhausted.

When the disease first declares itself, it not infrequently happens that the wound which had rapidly and entirely healed after the bite, begins to exhibit evidence of irritation or inflammatory action, tingling and itching severely, which causes the animal to gnaw and bite it, without even feeling the slightest

pain therefrom, as though there was a morbid sensation of numbness in that region. In the earlier stages constitutional disturbance and slight fever is present, with a rise of temperature to 104° , great nervous excitability, respiration of a peculiar sighing or sobbing character, and somewhat tumultuous. Toward the last, the agitation of the victim becomes increased, and the countenance is one of extreme terror and a marked embarrassment in the breathing, which is spasmodic or convulsive. He suffers from acute thirst, and when he swallows, violent paroxysms produced by spasm of the pharynx and larynx seem to suffocate him, which continues for several seconds, and are succeeded by feelings of intense alarm and distress. The attempt to drink is again renewed, but only to be followed by a repetition of the seizure until the unhappy sufferer ceases from sheer dread to quench his thirst, which torments him.

The patient is always susceptible and extremely sensitive to any kind of external impression. A bright light, a loud noise, a breath of cold air, contact with any one, are all apt to produce a convulsive seizure. Besides these suffocative attacks, there also occur general convulsions affecting the whole muscular system, and which is often thrown into a condition of tetanic spasm. These spasms increase in frequency and severity, with intervals of comparative quiet as the disease advances. In man, and other animals than the dog, the breathing becomes more laborious and jerking, accompanied by peculiar sonorous expirations, which often suggests to observers the notion that the sufferer "barks like a dog." During the latter stages there is always a viscid secretion in the mouth, which is ropy, thick and gluey. There is never great fever, but the bowels are always constipated and diminished flow of urine. After two or three days of suffering of the most terrible description, the animal succumbs, death taking place, either from a paroxysm of choking, or in a tranquil manner from nervous exhaustion, all the symptoms having abated, and the power of swallowing returning shortly before the end. The duration of the disease is generally from two to five days.

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Treatment.—Medicinal treatment of rabies is of no avail whatever. An antidote for the ptomaine has not yet been discovered. Pasteur says that the blood serum of a recovered case after undergoing certain preparation and treatment, at present only known to his laboratory, is a speedy and sure cure. However the world has not as yet recognized the fact.

Madstones, and the one thousand and one decoctions made from herbs, gathered only when the moon is under certain conditions, and hosts of other worthless nostrums, are all sterling phases of charlatanism, empiricism, and quack humbuggery. When hydrophobia has once declared itself, little can be done by the resources of the veterinarian or physician beyond palliating the agonizing sufferings, and thereby rendering easier and calmer the inevitably fatal termination.

Medicines cannot be administered by the mouth, owing to the impossibility of swallowing, the distress occasioned by the effort to do so, and the great risk of being bitten by the sufferer; therefore, anything given must be per rectum, hypodermically, or by inhalation. The most potent agents are the bromides, opium, its alkaloids, curara, chloral, chloroform, and hydrocyanic acid. The vapor bath is also recommended, but in this also, great risks are run. Prophylactic treatment is the only rightful course to pursue, and of most avail. When an animal or man is first bitten by a rabid or apparently healthy dog, endeavor to prevent the absorption of the virus into the system. This may be accomplished by complete excision of the part involved in the bite, or by sucking the wound by a cupping glass, or even by the mouth if practicable, after which the part ought to be thoroughly cauterized by nitrate of silver, caustic potash, nitric acid, or better still, actual cautery. Then place the animal in confinement to await developments; one month is considered a long enough period.

Do not kill the dog, as it prevents the person bitten from knowing whether hydrophobia will develop or not. If it does not mature, the persons bitten are perfectly safe and may sleep easy.

The reprehensible practice of muzzling dogs in hot weather ought to be prevented by law. No animal suffers more intensely from thirst than the dog, and it is gross ignorance on the part of the laity who practice it and it is cruelty to the animal, and serves no good end whatever.

Pathological Anatomy.—Post-mortem examinations have thrown much new light upon this malady, and much special attention has been given by certain eminent pathologists to this work. The chief morbid changes which are described are evidences of congestion and inflammatory action in certain portions of the brain and spinal cord, and most particularly in the locality known as the "respiratory centre" of the medulla-oblongata, where the accumulation of "lencocytes" around the small blood-vessels and in the surrounding nervous substances are a prominent phenomenon, similar changes are also found in the salivary glands.

On the whole, however, it can scarcely be said that the formidable array of symptoms above narrated are accounted for by these appearances, which in the opinion of some, are in all likelihood merely the results of antecedent processes of an occult nature, affecting the nerve centres, and forming the essence of this disease. The eighth pair of nerves, which are largely concerned in the processes of respiration and deglutition, are congested in a marked degree, and it is upon this portion of the nervous system that the poison or ptomaines most powerfully exerts its specific action. But that the whole great nerve centres, viz., the brain and spinal cord, as a whole, are profoundly affected, is manifest in the tendency to general convulsion, the remarkable hyperaesthesia, and the mental perturbation of the victim.

I could write more than I have already written on the latest experiments on rabies, and remarks on post-mortems by many able men, also much on treatment by our recent bacteriologists such as Sternberg, Gmelin, Lehman, Marchand, and others, but of this you can read at your leisure. I will, however, quote one master mind, at the risk of him quoting Pasteur.

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"From the symptoms observed during life, the conclusion naturally suggests itself that the brain and its membranes are the seat of organic lesions. Indeed the specific action of the poison appears to be exercised, particularly in the first instance, upon the medulla-oblongata and the par vagum, the branches of which seem to lose their natural properties, hence the difficulty in swallowing, breathing, the depraved appetite, alteration of voice, and its entire loss in the dumb form, as well as the convulsions of the respiratory muscles, are all due to the derangement of this nerve, and as the nervous system becomes more and more deranged, complete paralysis of the respiratory muscles occur, and the animal dies of asphyxia.

"The principal post-mortem appearances are œdema, or congestion, sometimes in patches, of the brain and spinal cord, particularly at the base and plexus choroides, effusion into the arachnoideal space, cerebral ventricles, and the cerebro-spinal substance and softening of the membranes. On the lower surface of the medulla-oblongata, at the margin of the seventh, eighth, and ninth pair of nerves, the membranes are generally thickened, softened, and clogged together. The liver, spleen, kidneys, and muscular system are congested. The bladder is empty and its mucous membrane covered with petecchiæ. The lungs are engorged with blood. The blood in the vessels is imperfectly coagulated, often black and tarry, sometimes bright and red in appearance.

"The mucous membrane of the pharynx, œsophagus, stomach, and bowels are either greatly congested or diffusely inflamed. Patches of extravasation are particularly met with on the gastric mucous membrane, which accounts for the hemorrhagic vomiting which is often witnessed during the illness. The contents of the stomach consists generally of hay, straw, stones, gravel, etc., in fact of a collection of the most incongruous materials, which, owing to the depraved appetite, the animal has picked up during life. This fact is of great value, as it proves almost conclusively that the dog has died rabid. The tongue is often wounded by the teeth, its papillæ congested, and the salivary

glands enlarged and vascular. In "dumb madness" the congestions of the upper part of the respiratory tract are developed to a greater degree than in any other form of this disease."

Remarks.—John Hunter says: "Individual susceptibility must be taken into account, as it is undeniable that many persons in whom the virus of rabies has been inoculated, escape hydrophobia. One instance that came under my notice, in which twenty-one persons were bitten by a rabid dog (proven so, beyond doubt) and only one died subsequently from hydrophobia, and comparisons by authentic authorities go to show that not one-third of those persons bitten by rabid animals die of rabies. A person bitten through his clothing is comparatively safe; only one per cent. die of rabies."

"It is supposed by some that the bite of an angry dog may produce rabies, and all the more so, if the animal should develop hydrophobia years after. The non-rabid animal, however enraged, cannot give rise to hydrophobia by his bite. Many persons die from mental derangement (delirium) produced by the fear of the consequences following a bite."

Treviranus found that all saliva reddened by the addition of sesquichlorid of iron; Leopoldi Gmelin discovered that this was caused by a sulpho-cyanate which is present in saliva. Poisoning from cyanic acid resembles slightly the latter stages of rabies.

The following paragraph appeared in the *London Herald of Health*, 1894: "It has been stated in this journal on previous occasions that the virus of rabies can be removed from perspiring animals by means of vapor baths. In non-perspiring animals, such as the dog, wolf, cat, and other flesh-eating animals, it is considered to be invariably fatal in its effects. Such animals should not be kept in captivity, unless kept hygienically clean, otherwise they are dangerous amidst human life. Any poison or virus that enters the body permeates the whole system. The pores of the skin allow much of its escape. In the non-perspiring animals this cannot occur, hence great muscular action, during rabies, in the dog. Dr. Buisson, Paris, France, was in-

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oculated with the virus of rabies from a patient, and the symptoms of the disease having become extreme, he resolved to die in vapor bath of 127° F., but instead of dying he was cured. This was twenty-nine years ago, and Dr. Buisson is living to-day, so there is no likelihood of the disease lying latent. It was not suppressed, it was entirely removed, and that beyond a doubt. Dr. Buisson has compiled a work on this treatment, and quotes many instances of recovery from rabies by vapor treatment that have occurred in his practice."

M. Pasteur wrote to a lady in Glasgow, Scotland, last year: "The bite of a dog is only dangerous when he is suffering from rabies. If there is any doubt about the animal's disease (if diseased) observe the following advice:

"Place the animal where it can do no further harm, have it examined by a qualified veterinarian, he will soon discover the characteristic symptoms of rabies. If suffering from rabies, he will surely die in eight days. If, at the end of two weeks, no symptoms of rabies have developed, the bite cannot cause hydrophobia, and there is no reason that the animal should be destroyed."

REPORT OF CASES.

LEFT LATERAL CURVATURE IN A FILLY.

By W. C. SIEGMUND, D.V.S.

This interesting case is that of a bay mare, three years, foaled a monstrosity with a left supero-lateral curvature of the spine. She is otherwise in perfect health. Her deformity consisted in having the appearance of being hunch backed with a peculiar condition of the spine. Looking from upwards, a lateral curvature with its convexity turned to the left is observed, presenting a curve of the spinous processes towards the left of the median line, extending from about the fourth dorsal to the second lumbar vertebræ, with a deep concavity looking to the

right. The right lateral view presents this hollow having on the posterior end a large prominence, hard and painless, with some soft spots here and there also bent to the left, and extending from the eighth or ninth dorsal vertebræ backwards and spreading upon the upper third of the ribs. The whole left side of the chest is bulging and more prominent, while the flank on the right is very hollowed as if the last two ribs were missing.

The animal lays down on either side and gets up without difficulty, all his functions seem perfectly normal.

The animal was destroyed in the dissecting rooms by bleeding and injected with plaster of Paris.

On removing the skin of the trunk, the parnniculus carnosus was observed to be pale, thin and very much distended on the left side, the superficial aponeurosis of the spinal muscles being very densely drawn and thin. The muscles on the right side presented nothing abnormal. The viscera were removed and found perfectly healthy. The vertebral column was then separated at the neck and lumbo sacral joint, the ribs left attached to the spine were sawed towards the upper third and the specimen, seat of the deformity prepared for the museum of the College.

It showed from the superior view the curvature of the vertebral spine, bodies and spines of these vertebræ from the 9th to the 18th, the bodies of the lumbar vertebræ are somewhat depressed to the right. On the right side the first eleven ribs present their normal curvature, but between the 12th and the 16th there is a wide depression which disappears at the last three ribs which have resumed their normal position.

Looking on the internal view, lower face of the bodies of the vertebræ, these concur in forming a large figure S, with the ten last dorsal. The posterio aorta presents the most interesting aspect. It follows the dorsal vertebræ in their curvature and forms also a large S with a kind of constriction back of the origin of coelias axis. Towards the back of the loins it has resumed its normal position until its quadrification. All the colateral are apparently perfect.

EXTRACTS FROM FOREIGN JOURNALS.

SUBNORMAL TEMPERATURES.

By E. F. DE JONG, F. R. C. V. S., Edinburgh.

An extract on the above subject which appeared in this week's *Record* has led me to pen these few remarks.

The use of the thermometer in veterinary practice cannot be over estimated, but we are apt to use it simply for the purpose of obtaining the amount of fever present. If after its application there is no indication of a rise above the normal we, as a rule, are quite satisfied; but it seems to me that we neglect to note if the temperature be *subnormal*, which is a point of considerable importance and might greatly assist us in our diagnosis.

I have recently had under treatment a case of "diabetes mellitus" in the horse, in which a subnormal temperature was marked, on one occasion being as low as 98.2F and never rising above 99.5.

If this temperature is constant in this disease it is a most important clinical fact, because this form of diabetes is not often met with in the horse, or at least I should say diagnosed.

The symptoms were intense thirst, coat dry and harsh, general unthriftiness, frequent micturition, etc., (very similar to those of the ordinary form) but my attention was directed to urine which was high colored and thick, the very reverse of diabetes insipidus.

I had some urine collected for me and it appeared very similar to the "golden syrup" of the grocer, but perhaps not quite so viscid.

Upon testing it with Fehling's solution it gave the characteristic reaction of sugar, but as this solution cannot be relied upon, unless freshly prepared, and as I had not other chemical re-agents handy for confirmatory tests, I took some of the urine to the Royal Infirmary in this city, where it was tested and reported to me that sugar was detected in large quantities.

Another point worth noting was the specific gravity, which instead of being diminished as in the insipidus form was greatly increased, it being 1060.

I have related this case not only to show that diabetes mellitus occurs in the horse, but also to record the subnormal temperature, which if it be constant, as already stated may be a most important factor in the differential diagnosis from diabetes insipidus. I would therefore suggest that more attention be paid to subnormal temperatures, from which I am sure there is a great deal to be learnt.

I will be pleased to hear through the medium of your valuable paper if any practitioners have met with subnormal temperatures, and in what diseases.—*Veterinary Record*.

HYDRO-THORAX.

Hydro-thorax can only be regarded as a grave complication of disease of the pleura, and perhaps other organs, consequently any treatment which will prevent or remove it is well worth our serious consideration. In your issue of September 29th, 1894, Mr. Malcolm draws attention to a method of treatment adopted by him, viz., the administration of iodine, and asks for the experience of others. A brief account of a case which occurred last November may prove interesting.

Subject, a brown cart gelding, five years old, under treatment for pleurisy. Four days after its admission to the infirmary signs of hydro-thorax were discovered, next day they were more pronounced, and on the sixth day the symptoms had become so aggravated that it was decided to relieve the dyspnoea by tapping, and also try the effect produced by the administration of iodine. The operation was performed with a fine trocar and canula on the animal's right side, and about five gallons of fluid abstracted. The fluid was of a dark straw colour, and when it flowed into the bucket caused a quantity of white froth, it was, in short, simply blood serum.

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then available, half ounce doses were administered three times daily in bolus, along with dram doses of iodide of potassium. This was continued for a week, and as the improvement following the operation was maintained half ounce doses daily only were given with vegetable tonics for some days longer. The horse showed great weakness, but was discharged quite fit for work in nine weeks from the commencement of his illness.

The ending of this case is highly satisfactory, but there are several points which will bear touching upon. First, how much of the credit of the cure is due to the operation and how much to the drug, or are there other unnoticed causes contributing to this favourable result? To determine these points requires a larger experience than one case. In the writer's experience the operation of paracentesis thoracis always affords relief and prolongs life, but very few cases have made a permanent recovery. When the operation had to be repeated death always followed. This case, however may be an exceptional one, but the result encourages a further trial of the drug. Perhaps if it had been administered earlier the effusion would have been checked and the necessity of an operation avoided. It may be mentioned that the late Professor Dick, in his lectures, used to relate a case of ascites in the dog which he cured by the administration of iodine. CYCLOPS.—*Ibid.*

PURPURA HÆMORRHAGICA, IODINE TREATMENT.

By JOSEPH FORGHAM, Hinstock, Market Drayton.

Subject, a black cart gelding, 9 years old, had been suffering from a bad cold or influenza, but with the exception of a few mashes and rest had received no treatment. I was requested to see him on Sunday morning, 6th January, 1895, at 11 a.m., and found the following symptoms:—

Both hind legs very much swollen right up into the thighs, with a serous oozing through the skin, dropping from the inside of the limbs. The sheath was swollen. The abdomen, for a

short space, appeared normal, swelling then commenced at a well marked line, and extended between the fore legs and over the breast. The lips and nostrils on the right side were slightly swollen, with a sero-sanguineous discharge from that nostril. Pulse 70, temperature 104, respiration increased about a third; refused all food and could scarcely be made to move.

Having read the translation by Mr. Dollar, and the report of Mr. Hopkin of Manchester, I decided to try iodine and iodide of potassium at hand I gave 3ii of the tincture and 3i of iodide of potassium. Saw the horse again at 7.30 p.m., much the same with regard to the swellings. The discharge from the nostril was less and the oozing from the thighs had almost ceased, the respiration about normal, pulse 60, temperature 105; ordered the dose to be repeated.

Monday 7th, 9.30 a.m. Respirations normal, pulse 60, temperature 103.5. Discharge from nostril and oozing from the thigh had ceased; swelling of the thighs decreasing, that on chest unaltered. The swelling of the lips had extended to the left side. The horse looked comfortable and was able to move about with comparative freedom, he had eaten a bran mash and some hay. I gave 3ii tincture of iodine and left a similar dose to be given in the evening.

Tuesday 8th, 10 a.m. Horse much improved, respirations and pulse normal; temperature 101; was feeding well, moved quite freely, swelling of the nostrils and lips much reduced, the thighs to a little above the hocks looked all right, the sheath and chest still swollen. Repeated the tincture morning and evening as before.

Wednesday 9th, 10 a.m. Very much worse, respirations increased; pulse 70; temperature 104. Nostrils and lips swelling fast, sero-sanguineous discharge from both nostrils and mouth very profuse, far worse than it was at first; the tongue a very bad colour and thickly spotted. Unable to give medicine by the mouth (which had been done up to this date), I diluted the tincture with four parts water and injected 3v into the trachea, further diluted 3ii of tincture and injected into the

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rectum. Had the nose sponged and afterwards dressed with the solution, beginning at the top of the swelling.

8.30 p.m. Worse than ever to look at, respirations quite as good, the pulse I was surprised to find less frequent and of a better character, the temperature was also down to 102.4. The discharge from the nostrils still profuse; could neither eat nor drink, the swelling of the lips being very bad, worse than the nostrils, the swelling by this time extended to two inches below the eyes. I had prepared a solution as given by Mr. J. A. W. Dollar, consisting of iodine, 1 part, iodide of potassium 2 parts, water 100 parts. I injected 3vii into the trachea, I also gave an injection into the rectum, but it was not retained long so gave a little more, further diluted. I then painted the head with the solution, beginning just above the swelling until I had thoroughly saturated the part. I had taken a tracheotomy tube with me, but did not think it was worth while to put it in as the breathing appeared easier.

Thursday 10th, 9.30 a.m. Was surprised to find the horse eating hay; the swelling about the lips being very much less he was able to pick up the hay and feed fairly well; the discharge from the nostrils had ceased, the swelling all over the head being much reduced, the injection into trachea appeared to cause no inconvenience so injected 3iv of the solution. The injection into the rectum had caused some irritation, the sphincter ani being very relaxed. Did not take the temperature; pulse 50 and stronger; respirations much improved. Painted the head again with the solution.

4.30 p.m. During the day he had eaten a fair quantity of fodder, some mash, and appeared thirsty. Gave 3ii of iodide of potassium in the drinking water.

Friday 11th, 10 a.m. Still improving in every respect. Repeated iodide of potassium in the drinking water, morning and evening.

Saturday 12th. Better, with the exception of being very lame on the off hind leg, but without swelling. Continued the iodide.

Sunday 13th. Doing well, the lameness having disappeared. Gave ferri sulph, as a tonic in the mash.

Monday 14th. Going on well, but would not eat the powders in his food, so gave ferri perchlor, in the drinking water; after which he received nothing but tonics for a few days, and has now made a good recovery.

Should I meet with another case I shall inject the solution into the trachea for a few times, and also increase the dose by the mouth, with the hope of preventing such a relapse as I had in this case.—*Ibid.*

REPORT OF COMMISSION AND SANITARY BOARD.

ILLINIOIS.—from which among interesting items on *Actinomyco-sis*, showing an inspection of 4046 heads, 1879 post-mortem and of 1361 carcasses condemned as unfit for food, on *Tuberculosis*, with a low record as to its presence in the state, on *Texas fever*, on *Anthrax*, on *Glanders* where 56 animals were slaughtered as diseased, on *Maladie, die Coit*, with one case only to record, and on *hog cholera*. We extract the following from State Veterinarian M. R. Trumbower, D. V. S.

"I made ninety-six trips for investigation outside of Chicago and Springfield, and visited 107 farms or residences; subsequently revisited fourteen of the places.

During this number of investigations, I found glanders and farcy twenty-five times.

I made about 1,900 post-mortem examinations of cattle (at Hess Bros'. and at Nash Bros'. slaughter houses in Chicago) that were arrested and quarantined by your agents for being actinomycotic and unfit for human consumption.

I spent fifty-five days at these houses for this purpose, and condemned, by warrant of authority as city meat inspector, 1,361 head; fifty-eight of which tuberculous, fifteen affected with cancer, and twelve were condemned for other causes, all the re-

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mainder were extensively affected with actinomycosis and deemed unfit for the market to be used for human food.

I made one trip to Kansas City, Mo., in November, 1893, to attend an Inter-State Sanitary meeting. Last June, by your request, I attended the meeting of the National Live Stock Sanitary Convention at Washington, D. C., and last September, as your delegate, I attended the meeting of the United States Veterinary Medical Association, at Philadelphia, Pa., where the question of the control of tuberculosis among cattle was fully discussed.

I met during the year with your board, or some of its members, by request, 46 times. I am pleased to state that my work has been agreeable, that I met no opposition anywhere in carrying out the provisions of the law, and that I believe the sanitary work pertaining to your commission is growing in favor, and its value is being appreciated more and more each year by the people of the State."

MASSACHUSETTS.—A most interesting report and probably one of the most important in our days containing as it does the details of the investigations and work done in connection with *tuberculosis*. This portion being exclusively treated shows that 5,394 were examined and tested with tuberculin with a result of 905 were found diseased. *Glanders*, holds an important percentage, 230 animals were reported suspected and on inspection 160 were condemned and destroyed.

MAINE.—Gives a daily report of the work done by the State Veterinarian and concludes:

"A summary of the whole number of stables and herds of of cattle inspected by our commission in 1894 will be found to be two hundred and one, as opposed to one hundred and forty-three in 1893, an excess of forty-eight cases. Ninety-two herds of cattle were inspected, while the number of stables of horses examined for glanders and farcy was one hundred and eight, which exceeded the number of last year by forty-six and there

is a very apparent cause for these latter inspections which will be given later in the report.

Forty-six head of cattle were condemned and destroyed at an appraisal of \$1,485.50, and sixty-four horses were also condemned and destroyed at an appraisal of \$2,692.50, the total amount of appraisals for the year being \$4,178."

COLORADO.—Where the following interesting list from State Veterinarian, Chas. Gresswell is found.

Horses—

Glanders and farcy	12	7
Reported as suspected glanders or farcy—		
Nasal gleet	15	12
Chronic Lymphangitis	8	4
Chronic catarrh	7	2
Chronic erysipelas	23	2
Venereal diseases	5	3
Acute blood poisoning	2	2
Epizootic influenza, scarlet fever and purpura	180	72
Laryngitis	2	1
Cerebro-spinal meningitis	1	25
Mange, Texas itch, etc.,	43	6
Spasmodic	7	10
Poisonous grasses or herbs	57	6
Totals	362	152

Cattle—

Actinomycosis	5	1
Anthrax	50	71
Cancer	1	3
Influenza and catarrh	28
Chronic laryngitis	2	4
Parasitic diseases	25	5
Tuberculosis	4	...
Poisons	26	13
Totals	113	125

Sheep—

1893.

1894.

Scab

In 13 counties.

In 18 counties.

Swine—

Swine plague

In 4 counties.

In 11 counties.

Estimated loss

Estimated loss

1,000 head.

5,000 head.

The above list includes the number of cases reported, the majority of which were personally investigated.

SOCIETY MEETINGS.

GERMAN VETERINARY MEDICAL ASSOCIATION,
FOR NEW YORK AND VICINITY.

The eighth annual General Meeting was held last Tuesday evening, April 15, 1895, at Dr. Sattler's Hospital, 112 Boyd St., Newark.

The meeting was called to order by the President, Dr. L. R. Sattler, Newark, upon roll call the following gentlemen responded to their names viz., Drs. Turner, Ogden, Amker, Wallace, Simman, Leissen, Leisgun, Serling.

The minutes of the previous meeting were read and approved. Several communications from absent members were read by the Secretary expressing regrets for being unable to attend the meeting. Then the Secretary's report was read, which showed the association to be in a flourishing condition numerically and the roll call showed a large increase. Three years ago, as this society was re-organized, I was chosen as your Secretary, and you have seen fit at every election of officers since to honor me with a re-election; a trust that I have not only felt honored and pleased with, but one that I have faithfully and earnestly tried to fulfill. As every proceeding report I have had encouraging and gratifying results of the conditions of the association to submit for your consideration; the record of the past year is no exception, and I am sure you will not contradict me when I say that veterinary science is making such rapid and successful strides forward that our society ranks on an equal with any veterinary organization in the state. This success is not only in increased numbers of members, and good financial standing, but is the interest, that nearly all veterinarians, and the press, and the public have shown in our monthly meetings. This is largely due to the individual members who have always taken an active part, always ready to respond to any appeal for aid to support and help along the good workings of this society. We are no longer an experiment or a theory but a practical success and I am positive that not a single member of our society to-day

will say that he has not received some benefit from the pleasant and interesting meetings of this Association. During the past year our monthly meetings have been successful and well attended. Interesting papers were read and were well received, and no doubt brought forth good fruit.

At our Monthly meeting 13th Nov., 1894, we were honored by the presence of our honorary member Prof. Dr. Liautard, who by his vast experience rendered us great and valuable aid in our important work. At that meeting he read a paper: Experimental researches upon the use of Malleine. Before closing this report I would state we have sustained a sad loss during the past year in the death of Drs. A. Kuntz, and Dr. Robert Leis. Both were very zealous active members of the profession and Dr. Kuntz was the founder and the moving genius of this organization. In closing I wish to thank most sincerely the Veterinary Review and the Journal of Comparative Medicine for their very generous act of kindness to the Society, and also to thank the members individually and the officers for their kind assistance and consideration, and for their kind attention to the present reports.

Dr. Turner moved that the report should be accepted and placed on file. Seconded by Dr. Ogden. Carried.

Then the report read by the Treasurer showed the Association to be in rather straightened condition financially.

Dr. Krause was proposed as a member of the Association and the Board of Censors will report on his application.

Then the nomination and election of the officers took place and the following officers were re-elected unanimously: Pres. Dr. Sattler Newark, Vice Pres. Dr. R. Leis. New Sec. Dr. H. Weelner, N. Y., Treas., Dr. Turner, N. Y., Bibliothek, Dr. O. Leis, Newark. Board of Censors: Drs. Serling, Amker, Ogden.

Then Dr. Sattler performed under assistance of the present colleagues an interesting operation on a three year old dog (bitch bull terrier) the sectio caesara. Five puppies were developed, three dead and 2 alive. The latter were put in an incubator

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on the advice of Dr. Serling, and were able after 3 hours to take the bottle. The owner of the dog was highly pleased and gave his heartiest thanks to the operator and society. After a prolonged and interesting discussion by the members, the meeting was finally adjourned. The next meeting will be held on May 16th, at Meyers Hotel, Hoboken.

H. WELLNER, D. V. S., Secretary.

PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

The Pennsylvania State Veterinary Medical Association held its annual meeting at the College of Physicians on March 5th, 1895, President Leonard Pearson in the Chair. A large number of members answered the roll call.

The minutes of the last meeting being read and approved, the President read his annual address, which was followed by nominations for officers and resulted in a vote by ballot as follows: President, Leonard Pearson; First Vice-President, W. H. Ridge; Second Vice-President, Thos. B. Raynor; Third Vice-President, Horace P. Keely; Treasurer, J. R. Hart; Recording Secretary, W. G. Bermer; Corresponding Secretary, F. S. Allen; Censors, Drs. Hoskins, Harger, J. Raynor, McNeil and Jimberman.

The examination by the Board of Censors for the application to membership resulted in the recommendation of Dr. Wentz, Bland, Kellner, Vandegrift, McClellan, Thompson and Willary.

In the afternoon session of this first day the Secretary and the Treasurer presented their reports, which were accepted and ordered on record.

The report of the Committee on Legislation was presented by Chairman Dr. W. H. Hoskins.

Dr. Allen offered the following resolutions:

WHEREAS, Since the office of State Veterinarian has recently been established by the Legislature, largely through the efforts of this Association, and

WHEREAS, It is to the interest of the public and the Veterinary profession that this new office should be filled by a competent man, be it

Resolved, That a committee of seven be appointed, whose duty it shall be to

determine who is best qualified to fill the position, to endorse this candidate and use the influence of this association to favor his appointment, and be it further

Resolved, That the above-mentioned committee shall consist of Dr. W. H. Hoskins, W. L. Zuill, T. B. Raynor, John R. Hart, J. C. McNeil, J. W. Salade and M. E. Conard.

Which was made as a motion and carried by a rising vote, 10 to 5.

The Chairman of the sub-committee, Prof. Harger, reported progress.

On account of changes made in the program Dr. J. Raynor was called upon to read his paper on *Rupture of the Stomach*.

The case was a heavy draught horse, who had not suffered from disease previous to this attack. His attention was called about 10 A. M., when he found patient standing quiet in a stall—drooping head, inappetence, feeble pulse and great weakness.

Upon closer examination—diagnosed paralysis of bowels.

Prescribed flax seed oil drenches and tepid soap water injections.

Horse suffered no pain, apparently, laid down naturally. No signs of vomition—dropped dead at 4 P. M. Post-mortem Rupture of Stomach.

Dr. Leonard reported cases of Aconite poisoning by the careless administration of tr. aconite by an employe, because the owner heard that tr. aconite was good for horses.

Had all the symptoms of acute poisoning, prescribed Amon. Carb., Digitalis and Whiskey, and Nitro-Glycerine Hypodermatically.

The case recovered entirely in about four days. Dr. Hoskins witnessed as many as 30 or 40 deaths from over-dosing with tr. aconite in the West Philadelphia horse marts.

He sees less of it now than formerly, as people recognize the value of veterinary assistance.

Dr. Hoskins asked whether the members present would give all the water a horse wanted while suffering from acute pleurisy.

Discussed by Drs. Lintz, Schreiber, Conrow, Goentner, Ridge, Bridge, Lusson, Noack, Kooker.

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The consensus of opinion was that the sufferer should have all the water he wanted, small quantities frequently repeated.

Dr. Hoskins by experiment found that the quantity of water offered had a great controlling influence upon the tendency to effusion, and believes in giving very little water.

It was generally conceded that it was extremely difficult to treat it successfully and the cases that did recover were worthless.

Dr. Lusson reported cases of Azoturia.

Dr. Jelton a case of Probable Influence with Œdema Glottis—tracheotomy—complete recovery.

Adjourned to meet next day at 10 A. M.

PHILADELPHIA, March 6, 1895.

The second day's session of the Pennsylvania State Veterinary Medical Association was called to order by President Pearson.

Prof. Harger presented then a valuable paper on Springhalt and his treatment, which was followed by an interesting discussion and report of cases by Dr. J. Raynor.

Prof. Zuill read a long and interesting paper on "Penetrating Street Nails," in which, after considering the varieties of injuries, he spoke of the treatment, calling attention to the use of Peroxyde of Hydrogen, dressing with iodoform. He generally condemns the use of poultices, but places great dependence on antiseptics.

The paper brought on a lively discussion, where most of the members took part.

Dr. Sallinger read a paper on Pneumonia, * which brought out the different opinions of most of the members present.

After some private business carried by the Executive Committee, the meeting returned to its labors by the discussion of Tuberculosis. Dr. A. E. Conrow, Ridge, J. S. Raynor, Hoskins,

* See this issue.

Kock, Zuill, Harger, took an active part in the discussion and brought on very interesting views on the subject. After voting that the next meeting shall be held in Pittsburg the Association adjourned.

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

The monthly meeting of the K. V. M. A. was held at the home of Dr. W. S. Kooker, No. 662 W. 11th St., Philadelphia, Tuesday evening, April 9th. After enjoying some fine music the meeting was called to order by Dr. Eves as President Lintz was not present.

The subject of Cerebro Spinal Meningitis brought forth quite an animated discussion, also some reminiscences very pleasant and otherwise to the practitioner most deeply interested at the time.

A case was cited of a driving mare, taking this disease and dying in four days after being hitched near an infected stable not longer than half an hour.

A case was also cited of Broodmare with foal at foot, which had not been out of upland pasture, and apparently very healthy location, for two months. She died within two days after showing symptoms of disease.

The Legislation of the past year was sifted and thoroughly discussed. The bill compelling all institutions receiving State aid to buy only meats killed within the State, also the bill compelling all meats shipped into the State to undergo a veterinarian's examination were both unanimously condemned as they were not in the interest of the people.

After a very interesting and highly instructive meeting the Society adjourned to meet at the office of Dr. W. H. Hoskins, May 14th.

Those fortunate enough to be present hoping Brother Kooker's future years may be as pleasant and instructive as the entertainment given them.

W. L. RHODES, D.V.S., Sec.

SUNDRIES AND ITEMS.

BOVINE TUBERCULOSIS.—The Governor of New Hampshire has vetoed the bill recently passed by the Legislature of that State appropriating \$100,000, for the suppression of bovine tuberculosis. Farmers' vote!

CAUTION.—Cases of glanders attributed to the use of impure equine serum are already noted. A recent writer states, moreover, that "although strenuously denied, it is now well ascertained that several of the horses from which antitoxin was obtained by Aronson were suffering from glanders."

Whether the above assertions are true or false, it certainly would be well for the medical profession at large to refresh themselves concerning the treatment of this usually fatal veterinary disease; also to scrutinize the product employed. (Medical Age).

DYPHTHERIA ANTITOXINE SERUM.

AT a meeting of the Paris Hospital Medical Society held on March 29th, according to the *Medical Week*, Dr. Variot referred to the fact that injections of antidiphtheritis serum in doses of from five to ten cubic centimetres caused a rise of temperature of from 2.25° to 4.5° F. He said this rise was undoubtedly due to some "hyperthermizing substance" contained in the serum, and the problem before us was to isolate from the serum this principle that might become a source of danger. Dr. Le Gendre confirmed this experience. Prof. Hayem referred to his former experiments and said: "Antidiphtheric serum obtained from a horse is necessarily toxic to man." This toxicity, he said, was due to albuminoid substances in which heat produced isomeric changes resulting in destruction of their noxious properties. Dr. Gougenheim, while approving of the administration of antitoxine serum, said that it was entirely without effect, even in very large doses, in cases of hypertoxic diphtheria. Dr. Sevestre stated that

he had injected ordinary horse serum into four children suffering from non-diphtheritic sore throat, and that the injections had produced slight febrile reaction and within a few days eruptions similar to those observed after injections of serum from an "immunized" animal. The latter, therefore, and not antitoxine itself, caused the untoward symptoms that followed the use of antitoxine serum. (N. Y. Medical Journal).

ANTISTREPTOCOCCOUS SERUM.

THE *Semaine medicole* states that Dr. Roger, Dr. Charrin, and Dr. Marmorek reported at a meeting of the Paris Biological Society held on March 30th, that they had employed antistreptococcus serum in the treatment of cases of erysipelas and puerperal septicæmia. Dr. Marmorek had administered an initial dose of ten cubic centimetres of serum, derived from horses or asses which had been rendered insusceptible by the inoculation of a very virulent culture of the streptococcus, to forty-six patients suffering from erysipelas, all of whom had recovered. Dr. Roger and Dr. Charrin had treated two cases of puerperal septicæmia, one case of erysipelas in a three-weeks'-old infant, and one case of pseudo-membranous angina with this serum, and the patients had recovered without complications. (Ibid).

TWO EASY AND DELICATE TESTS FOR ALBUMIN IN URINE.—Dr. C. Fouchlos (*Progress Medical*) recommends two new tests for albumin in urine, for which he claims utmost delicacy and absence of any possible fallacy :

1. Add to the suspected urine a few drops of a one per cent solution of corrosive sublimate ; in case of turbidity, add some drops of acetic acid. If the turbidity persists it is due to the presence of albumin.

2. Take 100 cc. of a ten per cent solution of sulphocyanide of potassium, and mix with it 20 cc. of acetic acid. Add a few drops of this mixture to the urine. If albumin is present in

small quantities, an immediate turbidity will ensue; if in larger quantities, a heavy white precipitate will appear.—*Med. and Surg. Rep.*

TO EXTERMINATE TUBERCULOSIS, the following plan is recommended by Dr. Law: Have a veterinary chief for each county or section where cattle are kept in large numbers. This chief should have entire charge, keep complete records, inspect all animals killed and if any die of a contagious disease test the herd the animal came from and then destroy every animal affected with a contagious disease and purify the premises. By this plan all public excitement would be avoided and the expense would be much less than to start in and make a housecleaning as is being done in Massachusetts. This plan being carefully carried out, there would be an object for the owners to dispose of their diseased animals by pointing out those supposed to be diseased.—*American Agriculturist.*

BIBLIOGRAPHY.

Police Sanitaire des Animaux—(Sanitary Medicine of Animals) by A. Conte, of the Toulouse School, 6th volume of the Cadeac Encyclopedia—J. B. Bailliere fils, rue Hautefeuille, Paris.

This volume continues the brilliant series of its predecessors.

Beginning with the introduction of the history of Sanitary legislation in France, it is followed by 4 parts—the first, where are considered the various modes of police interference, and general measures to be applied in cases of contagious diseases, such as inspection of fairs and markets, slaughter houses, means of transport, disinfection, etc. In the second, the special measures to be applied in each respective disease with consideration of the sanitary police in France, on the frontier and the special service in Algeria. In the third we are initiated

into the sanitary measures concerning horses in the army, the administration of the breeding establishments, and of the animals kept in the veterinary schools. In the last the subject of foreign sanitary legislation is considered.

Les Tuberculoses Animales. (Animal tuberculosis.) By Prof. Ed. Nocard,—G. Mojon. Paris.

A nice volume of some 200 pages, where the author has gathered the history, with symptoms, lesions, etc., of tuberculosis in the domestic animals. Beginning by a short introduction upon the general subject of tuberculosis and following it by some remarks on the species of animals which are subject to it, a careful but concise consideration is made of it as it manifests itself in bovines, swine, equine, small ruminants, carnivorous and birds, with a review of the whole history of the disease including the sanitary measures and prophylaxy pertaining to it, with indications as to the use of the products of the diseased animals.

The volume is one of the series of the scientific encyclopedia published under the direction of Mr. Leanté member of the Institute of Paris.

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OBITUARY.

Professor Jacob Meyer, Director of the Veterinary School of Zurich, Switzerland, died on the 8th of May last from sequelæ of influenza, in the 64th year of his age.